Atty. Dkt. No. 200209179-1

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1   1.   (Canceled)

1   2.   (Currently Amended) A method of determining a placement of services of a
2   distributed application onto nodes of a distributed resource infrastructure comprising
3   the steps of:
4   establishing an application model of the services comprising transport
5   demands between the services;
6   establishing an infrastructure model of the nodes comprising transport
7   capacities between the nodes;
8   forming an integer program that comprises:
9   a set of placement variables for a combination of the services and the
10   nodes, each of the placement variables indicating whether a particular service
11   is located on a particular node;
12   communication constraints between node pairs which ensure that a sum of
13   the transport demands between a particular node pair does not exceed the
14   transport capacity between the particular node pair, each term of the sum
15   comprising a product of a first placement variable, a second placement
16   variable, and the transport demand between the services associated with the
17   first and second placement variables; and
18   an objective; and
19   employing a local search solution to solve the integer program which
20   determines the placement of the services onto the nodes, wherein the services are
21   assigned to the nodes according to a previous assignment and further comprising
22   assessing reassignment penalties for placements of the services that differ from
23   the previous assignments.

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1   3.   (Canceled)

1   4.   (Original) The method of claim 2 wherein the objective comprises minimizing

2   communication traffic between the nodes.

1   5.   (Original) The method of claim 2 wherein the application model further

2   comprises processing demands for the services.

1   6.   (Original) The method of claim 5 wherein the infrastructure model further

2   comprises processing capacities for the nodes.

1   7.   (Original) The method of claim 6 wherein the integer program further comprises

2   processing constraints which ensure that a sum of the processing demands for each of

3   the nodes does not exceed the processing capacity for the node.

1   8.   (Original) The method of claim 7 wherein the objective comprises minimizing

2   communication traffic between the nodes and balancing the processing demands on

3   the nodes.

1   9.   (Original) The method of claim 6 wherein the processing demands and the

2   processing capacities are normalized according to a processing criterion.

1   10.   (Original) The method of claim 9 wherein the processing criterion comprises an

2   algorithm speed.

1   11.   (Original) The method of claim 9 wherein the processing criterion comprises a

2   transaction speed.

1   12.   (Original) The method of claim 9 wherein the processing capacities of the nodes

2   are found according to a look-up table in which different types of nodes have been

3   normalized according to the processing criterion.

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1   13.   (Original) The method of claim 2 wherein the application model further

2   comprises storage demands for the services.

1   14.   (Original) The method of claim 13 wherein the infrastructure model further

2   comprises storage capacities for the nodes.

1   15.   (Original) The method of claim 14 wherein the integer program further

2   comprises storage constraints which ensure that a sum of the storage demands for

3   each of the nodes does not exceed the storage capacity for the node.

1   16.   (Original) The method of claim 2 wherein the integer program further comprises

2   placement constraints which ensure that each of the services is placed on one and

3   only one of the nodes.

1   17.   (Canceled)

1   18.   (Canceled)

1   19.   (Currently Amended) The method of claim <u>2</u>[[18]] wherein the integer program

2   further comprises a second objective that seeks to minimize the reassignment

3   penalties.

1   20.   (Canceled)

1   21.   (Canceled)

1   22.   (Currently Amended) A computer readable memory comprising computer code

2   for directing a computer to make a determination of a placement of services of a

3   distributed application onto nodes of a distributed resource infrastructure, the

4   determination of the placement of the services onto the nodes comprising the steps of:

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5   establishing an application model of the services comprising transport

6   demands between the services;

7   establishing an infrastructure model of the nodes comprising transport

8   capacities between the nodes;

9   forming an integer program that comprises:

10   a set of placement variables for a combination of the services and the

11   nodes, each of the placement variables indicating whether a particular service

12   is located on a particular node;

13   communication constraints between node pairs which ensure that a sum of

14   the transport demands between a particular node pair does not exceed the

15   transport capacity between the particular node pair, each term of the sum

16   comprising a product of a first placement variable, a second placement

17   variable, and the transport demand between the services associated with the

18   first and second placement variables; and

19   an objective; and

20   employing a local search solution to solve the integer program which

21   determines the placement of the services onto the nodes, wherein the services are

22   assigned to the nodes according to a previous assignment and further comprising

23   assessing reassignment penalties for placements of the services that differ from

24   the previous assignments.

1   23.   (Canceled)

1   24.   (Original) The computer readable memory of claim 22 wherein the objective

2   comprises minimizing communication traffic between the nodes.

1   25.   (Original) The computer readable memory of claim 22 wherein the application

2   model further comprises processing demands for the services.

1   26.   (Original) The computer readable memory of claim 25 wherein the infrastructure

2   model further comprises processing capacities for the nodes.

1   27.   (Original) The computer readable memory of claim 26 wherein the integer
2   program further comprises processing constraints ensure that a sum of the processing
3   demands for each of the nodes does not exceed the processing capacity for the node.

1   28.   (Original) The computer readable memory of claim 27 wherein the objective
2   comprises balancing the processing demands on the nodes.

1   29.   (Original) The computer readable memory of claim 26 wherein the processing
2   demands and the processing capacities are normalized according to a processing
3   criterion.

1   30.   (Original) The computer readable memory of claim 29 wherein the processing
2   criterion comprises an algorithm speed.

1   31.   (Previously Presented) The computer readable memory of claim 29 wherein the
2   processing criterion comprises a transaction speed.

1   32.   (Previously Presented) The computer readable memory of claim 29 wherein the
2   processing capacities of the nodes are found according to a look-up table in which
3   different types of nodes have been normalized according to the processing criterion.

1   33.   (Original) The computer readable memory of claim 22 wherein the application
2   model further comprises storage demands for the services.

1   34.   (Original) The computer readable memory of claim 33 wherein the infrastructure
2   model further comprises storage capacities for the nodes.

1   35.   (Original) The computer readable memory of claim 34 wherein the integer
2   program further comprises storage constraints which ensure that a sum of the storage
3   demands for each of the nodes does not exceed the storage capacity for the node.

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1   36.   (Original) The computer readable memory of claim 22 wherein the integer

2   program further comprises placement constraints which ensure that each of the

3   services is placed on one and only one of the nodes.

1   37.   (Canceled)

1   38.   (Canceled)

1   39.   (Currently Amended) The computer readable memory of claim <u>22</u>[[38]] wherein

2   the integer program further comprises a second objective that seeks to minimize the

3   reassignment penalties.

1   40.   (Canceled)